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GRAIN SIZE EFFECT ON THE COLOSSAL MAGNETORESISTANCE IN GRANULAR PEROVSKITE $\text{La}_{0.7}\text{Pb}_{0.3}\text{MnO}_3$

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Abstract

Magnetic behaviors and transport properties in granular perovskite $\text{La}_{0.7}\text{Pb}_{0.3}\text{MnO}_3$ with different grain sizes have been synthesized. The results show that magnetic susceptibility, ferromagnetic ordering temperature and magnetoresistance are affected by the grain size. These compounds with different grain sizes exhibit two kinds of magnetoresistance origins, intragrain double exchange and intergrain interfacial tunneling. With the increasing grain size, the intrinsic transport is dominant while the extrinsic tunneling gradually disappears. Thus, the basis of magnetotransport mechanism is the result of competition between the double exchange interaction and the interfacial tunneling effect.

Key words : Granular; Perovskite; Magnetoresistance; Magnetotransport